EXTENDED ABSTRACT

1. Context and Rationale

The construction, transportation, energy, and military industries rely on the steel, iron, and aluminium sectors, which are the backbone of India's industrial landscape. Though West Bengal includes major iconic facilities of Tata Steel, SAIL, JSW and Essar Steel Limited and others, the area struggles with consistently high attrition driven by unsafe working conditions, limited career ladders, and turbulent employee relations. In this capital-intensive cluster, operational continuity, cost control, and competitiveness all depend on maintaining a steady, experienced workforce (OECD, 2020).

2. Research Aim, Objectives and Hypothesis

This research aims to assess the impact of employee retention activities on employees in the steel, iron, and aluminium industries of West Bengal. The specific objectives are:

I. **To Measure Job Satisfaction**:
   To evaluate how job satisfaction programmes affect retention activities within the steel, iron and aluminium sectors of West Bengal.

II. **To Estimate Employee Loyalty:**
   To examine how retention activities build loyalty by assessing recognition, commitment and worth in heavy metal industries of West Bengal.

III. **To Assess Employee Retention:**
   To assess the impact of career development and reward systems on employees' long-term retention within the industrial workforce.

IV. **To Evaluate Employee Well-being:**
   To investigate the role of workplace well-being, safety and work-life balance programs in enhancing employee retention and reducing turnover.

Hypothesis of the Study

i. Job Satisfaction

H_0: There is no significant correlation between employee retention activities and overall job satisfaction in the heavy metal industries of West Bengal.

H_1: There is a significant correlation between employee retention activities and overall job satisfaction in the heavy metal industries of West Bengal.

ii. Employee Loyalty

H_0: Employee recognition and reward systems do not significantly influence employee loyalty.

H_1: Employee recognition and reward systems significantly influence employee loyalty.

iii. Employee Retention

H_0: Career development and growth opportunities do not have a significant effect on employee retention.

H_1: Career development and growth opportunities have a significant positive effect on employee retention.

iv. Employee Well-being

- H_0: There is no significant difference in employee well-being and safety and work-life balance programs in enhancing employee retention.
- H_1: There is a significant difference in employee well-being safety and work-life balance programs in enhancing employee retention.

Instruments Used for Hypothesis Testing:

- Pearson Correlation: To compare independent and dependent variables.
- Multiple regression: Testing employee loyalty predictors.
- Survival Analysis (Cox Proportional-Hazards Model): To explore employee retention factors.
- Independent Samples T-Test: Compare work-life balance-based well-being ratings.

3. Literature Synthesis

Employee retention, especially in industrial and high-risk settings, is a multifaceted phenomenon shaped by a dynamic interplay of environmental, personal, and organisational factors. Across global literature, scholars interpret retention through the lens of social exchange theory, where employees evaluate the balance between contributions (effort, time, risk) and returns (salary, safety, recognition, career progression). According to Cropanzano & Mitchell

(2005), when the perceived returns exceed or match contributions, positive outcomes such as loyalty and satisfaction tend to follow.

In hazardous sectors such as steel and iron manufacturing, the literature underscores the centrality of safety climate and hazard mitigation as foundational to employee trust and commitment. Serenko (2022), stated that ArcelorMittal and POSCO reveal that companies that maintain strict safety standards and empower employees through training report lower attrition and higher engagement. These firms often utilise AI-driven systems to personalise feedback, monitor fatigue, and streamline safety reporting—technological advancements that Indian companies are gradually beginning to adopt.

In the Indian context, the literature provides specific insights into contextually appropriate retention strategies. According to Yeo *et al.*, (2021), companies like Tata Steel and SAIL have long implemented hybrid models of engagement that blend monetary incentives with community-focused welfare. These include subsidised housing colonies, access to family healthcare, educational sponsorships, and generous pension benefits. According to Nguyen, & Ha (2023), in West Bengal and other semi-urban industrial areas, this all-encompassing support system helps people see their jobs as investments for the future.

Still, holes remain despite these plans. According to Sharma and Roy (2023), the success of legacy welfare programs is hindered by increased expectations among younger employees and insufficient mid-career upskilling. As per Sepahvand & Bagherzadeh Khodashahri, (2021), Western HR models often fail to take into account the collectivist cultural orientation of Indian workforces. As a result, recognition systems in India must focus on group achievements and communal identity rather than individual performance metrics.

It is clear from the comparative literature that financial incentives are still important, but they can't motivate people to the same extent as psychological incentives like purpose, autonomy, and visibility. As per Gurchiek (2021), Generation Z and Millennials are prime examples of this, as they place a premium on non-traditional benefits such as purpose, autonomy, and mental health services.

Also, there are notable distinctions across jobs and roles, according to the research. As per Amushila & Bussin (2021), managerial staff are more influenced by opportunities for leadership development, strategic visibility, and autonomy, whereas shop-floor employees prioritise safety, timely wages, and stable shift schedules. Zaky *et al.* (2023) found that

technical staff occupy an intermediate position, valuing both extrinsic (training, tools, recognition) and intrinsic motivators (problem-solving autonomy, innovation exposure).

According to Conte & Siano (2023), synthesising these perspectives, this study developed a conceptual model where four primary constructs—engagement activities, reward systems, career development, and work–life balance—were hypothesised to predict satisfaction, loyalty, retention, and well-being, respectively. Each of these constructs was theorised to interact with psychological mediators (e.g., perceived organisational support, role clarity) and demographic moderators (e.g., tenure, age, education) to influence outcomes (CIPD, 2020).

4. Methodological Design

The study used a quantitative, cross-sectional survey approach to assess West Bengal's heavy-metal industry employees happiness, loyalty, well-being, and retention. Given the necessity to quantify interactions between different organisational variables across a diverse industrial workforce, this method seemed appropriate. A structured questionnaire was sent to 500 employees from six large steel, iron, and aluminium facilities. The sample included entry-level employees, executives, managers and senior management to ensure hierarchical and functional diversity. Data collection was conducted both online and in-person to accommodate participants' preferences spanned from April to December 2024.

The survey assessed employee engagement activities (e.g., safety efforts, wellness programs, recognition schemes), reward mechanisms, work–life balance, and career development opportunities using 5-point Likert scales. Researchers used binary indicators to collect continuous and categorical data on employees' willingness to stay.

Prior to complete deployment, a G*Power analysis was carried out to determine that the sample size was adequate for the t-test, regression, and correlation procedures, which are important for statistical robustness. Through pilot testing, we made sure the data was reliable, and we coded the responses numerically. Keeping participants' identities secret, getting their permission before using their data, and adhering to institutional policies on data privacy and voluntary participation were all ways in which ethical concerns were respected.

The data analysis made use of three essential statistical methods:

1. **Pearson's correlation analysis** an examination of the bivariate correlations among the variables using Pearson's correlation analysis, with a focus on the components of engagement and their link to work satisfaction.

2. **Cox Proportional-Hazards Model (Survival Analysis):** Analyses how career growth and benefits affect employee retention. Survival analysis is ideal for analysing time-to- event data and employee tenure. The model identified variables that protected retention.
3. **Multiple linear regression analysis,** by utilising multiple linear regression analysis and correcting for relevant confounders, we can uncover the strongest determinants of employee loyalty.
4. **Independent-samples t-tests** were used to compare operational, technical, and managerial retention rates.

5. Industry Landscape Findings

Results from the descriptive analysis of the dataset showed that operational positions make up a disproportionate share of the workforce; these roles are typified by physically difficult work, shorter tenure, and few prospects for advancement. Factors that contribute to employee discontent include political unpredictability, interruptions caused by unions, and infrastructure delays. All of these things add up to a turnover rate in the region of 18–20%, which is far higher than the private steel sector national average of about 12% in India. In the heavy-metal manufacturing environment of West Bengal, this increased attrition highlights the critical need for industry-specific retention methods.

6. Key Empirical Results

Analytical Lens	**Core Evidence**	**Interpretation**
Job-Satisfaction Correlations	Engagement effectiveness ↔ satisfaction ($r = 0.371$, $p < 0.01$); safety ($r = 0.285$); recognition ($r = 0.300$)	Well-designed engagement levers moderately uplift morale.
Multiple Regression on Loyalty	Sense of worth ($B = 0.283$, $p < 0.001$) and rewards ($B = 0.265$, $p < 0.001$)	Emotional value and tangible incentives outweigh

	emerged as strongest loyalty drivers; career growth not significant	promotion prospects in hazardous contexts.
Role-Based t-Tests	Managerial retention 78 % > technical 72 % > operational 56 % (all $p < 0.01$)	Front-line attrition reflects tougher conditions and shallow growth tracks.
Cox Proportional-Hazards Model on Employee retention	Employees who are more satisfied with career development opportunities are significantly less likely to leave, reducing their hazard of turnover by 23.4% (1 - 0.766).	Flexible rostering improves both health and retention propensity.

Several noteworthy results were produced by the empirical analysis:

- **Job Satisfaction**: Job satisfaction was found to be highly correlated with employee engagement activities, according to the correlational study. Additionally, there was a statistically significant link between safety initiatives ($r=0.285$) and recognition practices ($r=0.300$) and overall engagement efficacy ($r=0.371$, $p<0.01$). These findings provide more evidence that structured engagement levers have a positive effect on morale in the workplace.
- **Employee Loyalty**: The multiple regression model identified **sense of worth ($B = 0.283$, $p < 0.001$)** and **reward systems ($B = 0.265$, $p < 0.001$)** as the two most powerful predictors of loyalty. Surprisingly, **career development opportunities** were not found to significantly impact loyalty, suggesting that in hazardous work environments, immediate emotional and financial returns may matter more than long-term growth prospects.
- **Retention by Role**: T-tests revealed that **managerial staff** had the highest reported retention (78%), followed by **technical staff (72%)** and **operational employees (56%)**. All differences were statistically significant ($p < 0.01$), highlighting the vulnerability of front-line employees to dissatisfaction and attrition.
- **Well-Being and Work–Life Balance**: Employees who reported a **balanced work schedule** displayed significantly higher satisfaction levels and more favourable safety

perceptions. These results reinforce the role of flexible scheduling in enhancing both well-being and retention propensity.

Collectively, the model explained **26.8% of the variance** in employee loyalty, indicating that while the studied variables are influential, additional cultural, managerial, or macroeconomic factors may also be at play.

Sl. No.	Hypothesis Theme	Test Used	Null Hypothesis (H_0)	Alternative Hypothesis (H_1)	Result	Conclusion
1	Correlation between Employee Retention activities and Job Satisfaction	Pearson Correlation Analysis	There is no significant correlation between employee retention activities and overall job satisfaction.	There is a significant correlation between employee retention activities and overall job satisfaction.	Significant positive correlations ($r = 0.196$ to 0.371, $p < 0.01$)	Reject H_0: Retention activities significantly impact job satisfaction.
2	Impact of Predictors on Employee Loyalty	Multiple Regression Analysis	There is no significant relationship between reward system, employee recognition, self-worth, career growth and employee loyalty.	There is a significant relationship between reward systems, recognition and sense of worth and employee loyalty.	Model is significant ($F = 45.411$, $p < 0.000$), with Sense of Worth ($p = 0.000$) and Reward Effectiveness ($p = 0.000$) being significant predictors	Reject H_0: Sense of worth and reward effectiveness significantly predict employee loyalty.
3	Effect of Career Development, Reward, and Benefits on Retention	Cox Proportional-Hazards Model	Employee retention is not significantly affected by career development opportunities, competitive reward system, or employee benefits.	Employee retention is significantly affected by career development opportunities, competitive reward system.	Career Development ($p = 0.003$) and Reward ($p = 0.012$) significant; Benefits not significant ($p = 0.110$)	Reject H_0: Career development and competitive reward reduce employee turnover risk.
4	Influence of Work-Life Balance on Well-Being and Retention Factors	Independent Samples T-Test	There is no significant difference in well-being and workplace retention factors based on work-life balance ratings.	There is a significant difference in well-being and workplace retention factors based on work-life balance ratings.	All t-tests are statistically significant ($p < 0.05$); mean differences confirm improved well-being with better WLB	Reject H_0: Better work-life balance is significantly associated with enhanced well-being and retention indicators.

7. Discussion and Theoretical Alignment

The findings support social exchange theory, which states that employees are more loyal to companies that reward them with tangible and psychological rewards. Recognition and sense of worth strongly support this paradigm, demonstrating that organisational care, expressed in appreciation and safety, directly increases commitment.

Career development does not affect loyalty, contrary to data from white-collar or office-based sectors where upward mobility and skill acquisition are vital to retention. Employees in high-risk industries like steel mills may prioritize immediate security, concrete incentives, and emotional support over long-term development. Hazardous blue-collar jobs require new retention methods. Financial incentives should be used in conjunction with social assistance, public thanks, and health and safety safeguards.

8. Limitations

The study offers various benefits, even if it has several flaws. The first is that SMEs generally would find results meaningless if big companies were overemphasised. Second, given that it is a cross-sectional study, one cannot make any conclusions about cause and effect or explain changes in retention behaviour over time. Thirdly, social desiderability bias in self-reported data could distort it, therefore generating exaggerated degrees of felt involvement or safety satisfaction.

9. Future Research Horizons

Future research should analyse heavy-industry environments in Gujarat, Odisha, and Maharashtra to better understand staff retention. Qualitative interviews with a mixed-method approach may improve emotional and experiential aspects. Longitudinal studies could examine how outside shocks like economic downturns, automation, and ESG criteria affect retention patterns.

10. Concluding Synthesis

According to this study, instead of promotion ladders, West Bengal's heavy metal firms keep employees via care, safety, and gratitude. Strong safety cultures, competitive pay, actual recognition, and flexible life-balance support even in tough working conditions can help raise employee satisfaction and loyalty. These findings should be used in public policy and HR planning to balance the skilled workforce of the region over the next decade, therefore guaranteeing its industrial engine and global competitiveness. Above advertising, this study

contends, safety, recognition, and well-being come first for the West Bengal heavy-metal industries. Competitive compensation, recognition, safety cultures, and flexible work schedules help to retain, retrain and involve staff. Through how they will be able, these guidelines will enable HR and regulatory systems to boost industry competitiveness and productivity.